

WHAT IS CLAIMED IS:

1. Apparatus for manufacturing a three-dimensional object by a generative manufacturing method, wherein the object is manufactured in a vertical direction layer-wise
5 from a building material having

a support,

a material application device for applying layers of a building material onto a support (4) or a layer, which was applied before, and

an arrangement for interconnecting the applied layer with a layer, which was
10 applied before, in a solidification region, characterized in that

the support and the material application device are moveable with respect to each other in such a way, that during the interconnection of the applied layer to a layer, which was applied before, the layer, which was applied before, and the material application device are moved with respect to each other and the support can be moved relative to the material
15 application device in a rotational movement with feed in direction of the axis of rotation.

2. An apparatus for manufacturing a three-dimensional object by a generative manufacturing method, in which the object is manufactured in a vertical direction layer-wise from a building material, having

a support,

20 a material application device for applying layers of a building material onto a support or a layer, which was applied before and

an arrangement for interconnecting the applied layer with a layer, which was applied before, in a solidification region, characterized, in that

the support and the material application device are moveable with respect to each other in such a way, that the interconnection of an applied layer to a layer, which was applied before, is carried out without an interruption of the supply of material and the support can be moved relative to the material application device in a rotational movement with feed in direction of the axis of rotation.

3. Apparatus for manufacturing a three-dimensional object by a generative manufacturing method, wherein the object is manufactured in a vertical direction layer-wise from a building material, having

a support,

a material application device for applying layers of a building material onto a support (4) or a layer, which was applied before, and

an arrangement for interconnecting the applied layer with a layer, which was applied before, in a solidification region, characterized in that

the support and the material application device are moveable with respect to each other in such a way, that the relative movement only occurs in one direction and that during the application of material the support and the material application device are moved relative to one another in such a way, that the relative movement occurs only in one direction.

4. Apparatus according to claim 3, wherein the support can be moved relative to the material application device in a rotational movement with feed in direction of the axis of rotation.

5. Apparatus according to claim 1, wherein the feed is carried out continuously or in steps.

6. Apparatus according to claim 2, wherein the feed is carried out continuously or in steps.

7. Apparatus according to claim 4, wherein the feed is carried out continuously or in steps.

8. Apparatus according to claim 1, wherein the support and the material application device are moveable in such a way, that in a complete rotation the support departs from the material application device by an amount of a thickness of one layer.

9. Apparatus according to claim 2, wherein the support and the material application device are moveable in such a way, that in a complete rotation the support departs from the material application device by an amount of a thickness of one layer.

10. Apparatus according to claim 4, wherein the support and the material application device are moveable in such a way, that in a complete rotation the support departs from the material application device by an amount of a thickness of one layer.

11. Device according to claim 1, wherein the support moves and the material application device and the arrangement for interconnecting the layers are stationary.

12. Device according to claim 2, wherein the support moves and the material application device and the arrangement for interconnecting the layers are stationary.

13. Device according to claim 3, wherein the support moves and the material application device and the arrangement for interconnecting the layers are stationary.

14. Apparatus according to claim 1, wherein the support is stationary and the material application device and the arrangement for interconnection move.

15. Apparatus according to claim 2, wherein the support is stationary and the material application device and the arrangement for interconnection move.

16. Apparatus according to claim 3, wherein the support is stationary and the material application device and the arrangement for interconnection move.

17. Apparatus according to claim 1, wherein the velocity and/or the feed in direction of the axis of rotation can be varied.

18. Apparatus according to claim 2, wherein the velocity and/or the feed in direction of the axis of rotation can be varied.

5 19. Apparatus according to claim 4, wherein the velocity and/or the feed in direction of the axis of rotation can be varied.

20. Apparatus according to claim 1, wherein the circumferential velocity of the rotational movement can be varied.

10 21. Apparatus according to claim 2, wherein the circumferential velocity of the rotational movement can be varied.

22. Apparatus according to claim 4, wherein the circumferential velocity of the rotational movement can be varied.

23. Apparatus according to claim 1, wherein several solidification regions are provided.

15 24. Apparatus according to claim 2, wherein several solidification regions are provided.

25. Apparatus according to claim 4, wherein several solidification regions are provided.

26. Apparatus according to claim 23, wherein several supports are provided.

20 27. Apparatus according to claim 24, wherein several supports are provided.

28. Apparatus according to claim 25, wherein several supports are provided.

29. Apparatus according to claim 26, wherein the feeds of the supports can be controlled independently.

30. Apparatus according to claim 27, wherein the feeds of the supports can be controlled independently.

31. Apparatus according to claim 28, wherein the feeds of the supports can be controlled independently.

5 32. Apparatus according to claim 23, wherein the supports make a rotational movement on a non-circular path, preferably a polygon with n corners, for the case that n supports are provided.

10 33. Apparatus according to claim 24, wherein the supports make a rotational movement on a non-circular path, preferably a polygon with n corners, for the case that n supports are provided.

34. Apparatus according to claim 25, wherein the supports make a rotational movement on a non-circular path, preferably a polygon with n corners, for the case that n supports are provided.

15 35. Apparatus according to claim 23, wherein several material application devices are provided.

36. Apparatus according to claim 24, wherein several material application devices are provided.

37. Apparatus according to claim 25, wherein several material application devices are provided.

20 38. Apparatus according to claim 23, wherein to each solidification region there is assigned an arrangement for interconnection of the applied layer to a layer, which was applied before.

39. Apparatus according to claim 24, wherein to each solidification region there is assigned an arrangement for interconnection of the applied layer to a layer, which was applied before.

5 40. Apparatus according to claim 25, wherein to each solidification region there is assigned an arrangement for interconnection of the applied layer to a layer, which was applied before.

41. Apparatus according to claim 1, wherein the building material is in form of powder and the apparatus for interconnection of the applied layer to a layer of the building material, which was applied before, is preferably a laser for sintering the powder or an
10 arrangement for solidification of the powder by a glue.

42. Apparatus according to claim 2, wherein the building material is in form of powder and the apparatus for interconnection of the applied layer to a layer of the building material, which was applied before, is preferably a laser for sintering the powder or an arrangement for solidification of the powder by a glue.

15 43. Apparatus according to claim 3, wherein the building material is in form of powder and the apparatus for interconnection of the applied layer to a layer of the building material, which was applied before, is preferably a laser for sintering the powder or an arrangement for solidification of the powder by a glue.

20 44. Apparatus according to claim 1, wherein the support is part of a container for accommodating the building material.

45. Apparatus according to claim 2, wherein the support is part of a container for accommodating the building material.

46. Apparatus according to claim 3, wherein the support is part of a container for accommodating the building material.

47. Method for manufacturing a three-dimensional object by a generative manufacturing method, wherein the object is manufactured in a vertical direction layer-wise from a building material by applying layers of the building material onto a support or a layer, which was applied before, by a material application device and interconnecting the applied layer
5 to a layer, which was applied before, characterized in that

the support and the material application device can be moved relative to each other in such a way, that while the applied layer is interconnected with a layer, which was applied before, the layer, which was applied before and the material application device are moved with respect to each other and wherein the relative movement of the material application
10 device and the support is executed in such a way, that a point on the support moves on a helical path.

48. Method for manufacturing a three-dimensional object by a generative manufacturing method, wherein the object is manufactured in a vertical direction layer-wise from a building material by applying layers of the building material onto a support or a layer,
15 which was applied before, by a material application device and interconnecting the applied layer with a layer, which was applied before, characterized in that

the support and the material application device can be moved relative to one another in such a way, that the interconnection of an applied layer to a layer, which was applied before, is carried out without interruption of the supply of material and wherein the relative
20 movement of the material application device and the support is executed in such a way, that a point on the support moves on a helical path.

49. Method for manufacturing a three-dimensional object by a generative manufacturing method, wherein the object is manufactured in a vertical direction layer-wise from a building material by applying layers of the building material onto a support or a layer,
25 which was applied before, by a material application device and interconnecting the applied layer with a layer, which was applied before, characterized in that

the support and the material application device can be moved relative to each other in such a way, that the relative movement occurs only in one direction and that they are moved relative to each other during the application of material.

50. Method according to claim 49, wherein the relative movement of the material application device and the support is executed in such a way, that a point on the support moves on a helical path.

51. Method according to claim 47 having the steps

(a) applying building material layer-wise and

(b) interconnecting the applied building material of a layer with the building material of a layer, which was applied before,

characterized in that

the steps (a) and (b) are carried out concurrently, but always in different regions.

52. Method according to claim 48 having the steps

(a) applying building material layer-wise and

(b) interconnecting the applied building material of a layer with the building material of a layer, which was applied before,

characterized in that

the steps (a) and (b) are carried out concurrently, but always in different regions.

53. Method according to claim 49 having the steps

(a) applying building material layer-wise and

(b) interconnecting the applied building material of a layer with the building material of a layer, which was applied before,

characterized in that

the steps (a) and (b) are carried out concurrently, but always in different regions.

54. Method according to claim 47, wherein at least two objects are manufactured concurrently.

5 55. Method according to claim 48, wherein at least two objects are manufactured concurrently.

56. Method according to claim 49, wherein at least two objects are manufactured concurrently.

10 57. Method according to claim 50, wherein a turn of the helix is circular, polygonal with n corners, oval or irregularly curved.

58. Method according to claim 50, characterized in that a section of the helical path runs linearly in the direction of the helical axis.

59. Method according to claim 47, wherein the layer of the building material is applied with a thickness, that varies within the building region.

15 60. Method according to claim 48, wherein the layer of the building material is applied with a thickness, that varies within the building region.

61. Method according to claim 49, wherein the layer of the building material is applied with a thickness, that varies within the building region.

20 62. Method according to claim 47, wherein the method for generatively manufacturing a three-dimensional object is a laser sintering method or a 3D print method.

63. Method according to claim 48, wherein the method for generatively manufacturing a three-dimensional object is a laser sintering method or a 3D print method.

64. Method according to claim 49, wherein the method for generatively manufacturing a three-dimensional object is a laser sintering method or a 3D print method.